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10/594,031	09/25/2006	Kenji Shiga	12477/13	4637

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KENYON & KENYON LLP
1500 K STREET N.W.
SUITE 700
WASHINGTON, DC 20005

EXAMINER	
JONES JR., ROBERT STOCKTON	
ART UNIT	PAPER NUMBER
4151	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/594,031	SHIGA ET AL.	
	Examiner	Art Unit	
	ROBERT JONES	4151	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-36* is/are rejected.

7)☒ Claim(s) *25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :9/25/06, 10/27/06, 1/3/07, 2/11/08, 7/16/08.

DETAILED ACTION

Claim Rejections – 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-5, 17-21, and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Shiga et al. (US Patent No. 7,084,214, referred to hereafter as Shiga).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding Claims 1-5, 17-21, and 23, Shiga teaches a polyester resin composition comprising an amorphous polyester, at least one component selected from the group consisting of a crystalline polyester and a nucleating agent, and optionally a reactive compound (col. 3, lines 29-35). The amorphous polyester preferably comprises

an aromatic carboxylic acid having 8 to 14 carbon atoms and an aliphatic or cycloaliphatic glycol having 2 to 10 carbon atoms as main components (col. 4, lines 10-14). "Main component" is defined such that an amount of an aromatic carboxylic acid having 8 to 14 carbons or an aliphatic or cycloaliphatic glycol having 2 to 10 carbon atoms is at least 50% by mole (col. 4, lines 14-17). Preferably, the aromatic carboxylic acid is terephthalic acid, isophthalic acid, or their mixture (col. 4, lines 27-28). The glycol component is preferably at least one of ethylene glycol, diethylene glycol, neopentyl glycol, cyclohexanedimethanol, 1,3-propanediol and 2-methyl-1,3-propanediol. The crystalline polyester preferably comprises at least 50% by mole of at least one alcohol selected from the group consisting of ethylene glycol, 1,3-propanediol, 1,4-butanediol, 1,6-hexanediol, and cyclohexanedimethanol (col. 7, lines 56-63). The crystalline polyester may also comprise a polybasic carboxylic acid such as terephthalic or isophthalic acid (col. 6, lines 7-12). Specific examples of the reactive compound include styrene/methyl methacrylate/glycidyl methacrylate copolymers (col. 8, lines 31-32). One example of the reactive compound consists of 36.4 parts styrene, 37.3 parts glycidyl methacrylate, and 26.3 parts methyl methacrylate. The weight average molecular weight of the reactive compound is preferably from 200 to 500,000 (col. 8, lines 36-41).

6. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Akira et al. (Japanese Patent Pub. No. 2003238777, referred to hereafter as Akira).

Regarding Claims 1-5, Akira teaches a polyester composition comprising a polyester resin and a reactive compound having a weight average molecular weight of

200-500,000 (p. 2, Claim 1). Akira's reactive compound contains a glycidyl group and/or two or more isocyanate groups per molecule (p. 3, Claim 2). An example of Akira's reactive compound is described as a styrene/methyl methacrylate/glycidyl methacrylate copolymer (p. 10, para. [0036], lines 1-5). The compound is further described as comprising 36.4 % styrene by weight, 37.3% glycidyl methacrylate, and 26.3% methyl methacrylate (p. 13, para. [0057], lines 3-4). The polyester resin is amorphous (Claim 4), and comprises an aromatic dicarboxylic acid having 8-14 carbons and aliphatic or alicyclic glycols having 2-10 carbons (p. 3, Claim 5). The aromatic dicarboxylic acid can be terephthalic or isophthalic acid (p. 3, Claim 6). The Markush group of Akira's Claim 7 (p. 3) dealing with the glycol component anticipates the requirements of the instant Claim 4.

Claim Rejections – 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Akira as applied to claims 1-5 above, and further in view of Borman (US Pat. No. 3,953,404).

Regarding Claim 6, Akira remains as applied above in Claims 1-5. Akira does not teach that the amorphous polyester resin contains a polyfunctional compound

having three or more carboxyl groups and/or hydroxyl groups as a monomer component at 0.001 to 5 mole% of an acid component and/or a glycol component.

In the same field of endeavor, Borman teaches a branched polymer comprising poly(1,4-butylene terephthalate) and a branching component which contains at least three ester-forming groups, said branching component being included from 0.01 to 3 mole percent based on the terephthalate units (col. 2, lines 50-55). Examples of suitable branching components are tri- or tetracarboxylic acids, triols, and tetrols (col. 3, lines 32-36). Branching in the PBT polymer results in increased molecular weight (col. 2, lines 39-42) and higher melt strength (col. 3, lines 40-43).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Akira's polyester resin to include Borman's branching component for the benefit of increased molecular weight and higher melt strength.

9. Claims 1-5, 7-11, 13-15, and 25-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Avramova et al. (US Pat. No. 4,915,885, referred to hereafter as Avramova) in view of Akira (Japanese Patent Pub. No. 2003238777).

Regarding Claims 1-5, 7-11, 13-15, and 25-35, Avramova teaches a homogenous amorphous polymeric blend of poly(ethylene terephthalate) (PET) and poly(butylene terephthalate) (PBT) (Abstract), said blend comprising a mixture of both polymers in the amorphous state (col. 2, lines 60-67). The PET-PBT blend exhibits a higher tensile strength and elasticity modulus with respect to pure commercial PET and PBT separately, and preserves its amorphous state at room temperature.

Avramova does not teach a reactive compound containing two or more glycidyl groups and/or isocyanate groups per one molecule and having a weight average molecular weight of not less than 200 and not more than 500 thousand, and further does not teach said reactive compound comprising 20-99% by weight of vinyl aromatic monomer, 1-80% by weight of hydroxyalkyl (meth) acrylate, and 0-79% by weight of alkyl (meth) acrylate.

In the same field of endeavor, Akira teaches a polyester composition comprising a polyester resin and a reactive compound having a weight average molecular weight of 200-500,000 (Claim 1). Akira's reactive compound contains a glycidyl group and/or two or more isocyanate groups per molecule (Claim 2). An example of Akira's reactive compound is described as a styrene/methyl methacrylate/glycidyl methacrylate copolymer (p. 10, para. [0036], lines 1-5). The compound is further described as comprising 36.4 % styrene by weight, 37.3% glycidyl methacrylate, and 26.3% methyl methacrylate (p. 13, para. [0057], lines 3-4). The polyester resin is amorphous (Claim 4), and comprises an aromatic dicarboxylic acid having 8-14 carbons and aliphatic or alicyclic glycols having 2-10 carbons (Claim 5). Said reactive compound improves melt strength during extrusion (p. 9, para. [0034], lines 4-7).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Avramova's blend of amorphous PET and PBT to include Akira's reactive compound for the benefit of improving melt strength during extrusion.

10. Regarding Claims 25-35, Avramova teaches a process of preparing a homogenous amorphous polymeric blend of poly(ethylene terephthalate) (PET) and

poly(butylene terephthalate) (PBT) (Abstract, lines 1-3), said blend comprising a mixture of both polymers in the amorphous state (col. 2, lines 60-67). The PET-PBT blend exhibits a higher tensile strength and elasticity modulus with respect to pure commercial PET and PBT separately, and preserves its amorphous state at room temperature. Avramova's process consists of mixing the PET and PBT, melting the mixture, and cooling the mixture (Claim 1), and may further comprise forming the polymeric blend into a shaped object during the cooling step, comparable to melt molding.

Avramova does not teach a reactive compound containing two or more glycidyl groups and/or isocyanate groups per one molecule and having a weight average molecular weight of not less than 200 and not more than 500 thousand, and further does not teach said reactive compound comprising 20-99% by weight of vinyl aromatic monomer, 1-80% by weight of hydroxyalkyl (meth) acrylate, and 0-79% by weight of alkyl (meth) acrylate.

In the same field of endeavor, Akira teaches a polyester composition comprising a polyester resin and a reactive compound having a weight average molecular weight of 200-500,000 (p. 2, Claim 1). Akira's reactive compound contains a glycidyl group and/or two or more isocyanate groups per molecule (p. 3, Claim 2). An example of Akira's reactive compound is described as a styrene/methyl methacrylate/glycidyl methacrylate copolymer (p. 10, para. [0036], lines 1-5). The compound is further described as comprising 36.4 % styrene by weight, 37.3% glycidyl methacrylate, and 26.3% methyl methacrylate (p. 13, para. [0057], lines 3-4). The polyester resin is amorphous (p. 3, Claim 4), and comprises an aromatic dicarboxylic acid having 8-14

carbons and aliphatic or alicyclic glycols having 2-10 carbons (p. 3, Claim 5). Said reactive compound improves transparency and prevents sagging during extrusion of the polyester resin composition.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Avramova's process to include Akira's reactive compound for the benefit of improving transparency and preventing sagging during extrusion.

11. Claims 12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Avramova in view of Akira as applied to claims 1-5, 7-11, and 13-15 above, and further in view of Borman (US Pat. No. 3,953,404).

Regarding Claims 12 and 16, Avramova in view of Akira remains as applied above in Claims 1-5, 7-11, and 13-15.

Avramova and Akira do not teach that either of the amorphous polyester resins (I) or (III) contain a polyfunctional compound unit having three or more carboxyl groups and/or hydroxyl groups as a monomer component at 0.001 to 5 mole% of an acid component and/or a glycol component, respectively.

Borman teaches a branched polymer comprising poly(1,4-butylene terephthalate) and a branching component which contains at least three ester-forming groups, said branching component being included from 0.01 to 3 mole percent based on the terephthalate units (col. 2, lines 50-55). Examples of suitable branching components are tri- or tetracarboxylic acids, triols, and tetrols (col. 3, lines 32-36). Branching in the PBT polymer results in increased molecular weight (col. 2, lines 39-42) and higher melt strength (col. 3, lines 40-43).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Avramova in view of Akira to further include Borman's branching component in either of the amorphous polyester resins (I) and/or (III) for the benefit of increased molecular weight and higher melt strength.

12. Claims 17-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moens et al. (US Pat. Pub. No. 2003/0153640, referred to hereafter as Moens) in view of Akira (Japanese Patent Pub. No. 2003238777).

Regarding Claims 17-24, Moens teaches a powdered thermosetting composition including a binder which comprises a carboxyl group containing amorphous isophthalic acid containing polyester, a carboxyl group containing semi-crystalline polyester, a glycidyl group containing acrylic copolymer, and a curing agent having functional groups reactive with the polyesters' carboxyl groups (p. 2, para. [0018]-[0022]). The amorphous polyester is preferably composed of isophthalic acid and the alcohol constituent is, for example, neopentyl glycol (p. 2, para. [0026]). The semi-crystalline polyester is preferably composed of terephthalic acid and an alcohol such as ethylene glycol, 1,3-propanediol, or 1,4-butanediol (p. 3, para. [0040]). Poly(ethylene terephthalate) (PET) meets these compositional requirements. Moens makes no statement precluding the use of recycled or reproduced PET. One of ordinary skill in the art will recognize that recycled PET still necessarily meets Moens' compositional requirements, and therefore should not be differentiated from the embodiments of the invention discussed in paragraphs [0037]-[0051] of Moens' specification. It is noted that Claim 17 requires a crystalline polymer resin, and Moens makes use of a

semicrystalline polymer. A semi-crystalline polyester inherently contains regions that are substantially crystalline. Further, the applicant is silent with respect to the degree of crystallinity required. Therefore, Moens' semicrystalline polymer, being substantially crystalline, meets the requirements of the instant claim. The glycidyl group containing acrylic copolymer is preferably composed of 10-90 mole% of a glycidyl group containin gmonomer such as glycidyl methacrylate (p. 3, para. [0053]-[0054]), 40 to 100 mole% methyl acrylate (p. 3, para. [0054]-[0055]), and 0-60 mole% of another ethylenically unsaturated monomer such as styrene (p. 4, [0056]). The amorphous polyester may optionally incorporate up to 15 mole% relative to the isophthalic acid, of polyacids having at least three carboxylic acid groups (p. 2, para. [0028]), or up to 15 mole% relative to the diol of trifunctional or tetrafunctional polyols (p. 2, para. [0030]).

Moens does not teach that the weight-average molecular weight of the glycidyl-containing acrylic copolymer is between 200 and 500,000.

In the same field of endeavor, Akira teaches a polyester composition comprising a polyester resin and a reactive compound having a weight average molecular weight of 200-500,000 (p. 2, Claim 1). Having a molecular weight of 200,000 or less prevents unreacted portions of the reactive compound bleeding out on the surface of the composition (p. 9, para. [0033], lines 4-8). Having a molecular weight greater than 500,000 leads to the possibility of voids forming (p. 9, para. [0033], lines 8-10). Akira's reactive compound contains a glycidyl group and/or two or more isocyanate groups per molecule (Claim 2). An example of Akira's reactive compound is described as a styrene/methyl methacrylate/glycidyl methacrylate copolymer (p. 10, para. [0036], lines

1-5). The compound is further described as comprising 36.4 % styrene by weight, 37.3% glycidyl methacrylate, and 26.3% methyl methacrylate (p. 13, para. [0057], lines 3-4).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Moens' composition in view of Akira such that the weight average molecular weight of Moens' glycidyl-containing acrylic copolymer is between 200 and 500,000. Moens' composition would thus receive the benefit of preventing unreacted portions of the acrylic copolymer from bleeding out on the surface of the composition and reducing the possibility of voids forming.

13. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Avramova in view of Akira as applied to claims 25-35 above, and further in view of Cappuccio et al. (US Pat. No. 3,350,328).

Regarding Claim 36, Avramova in view of Akira remains as applied above in Claims 25-35. Avramova further does not teach the process according to Claim 25, wherein the crystalline polyester resin (IV) is reproduced polyethylene terephthalate.

In the same field of endeavor, Cappuccio teaches a process for regeneration of polyethylene terephthalate (PET) from wastes of said polymer (col. 1, lines 21-22). Terephthalates recycled in accordance with Cappuccio's invention have a high degree of purity and can be used for the preparation of fibers, films, shaped articles, and the like (col. 2, lines 1-5). Further, the regenerated products have been found to have higher molecular weights and a higher degree of solubility in solvents such as cresols.

Examples 1 and 2 result in PET having a melting point of 257 and 254.5°C, respectively, indicative of crystallinity at room temperature.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Avramova in view of Akira as applied above. It would have been obvious to further modify Avramova in view of Cappuccio to include recycled crystalline PET. The use of Cappuccio's recycled PET would result in a higher molecular weight, and would likely reduce the cost of starting materials when compared with commercial non-recycled PET.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT JONES whose telephone number is (571)270-7733. The examiner can normally be reached on Mon-Thurs, 7:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz can be reached on (571)272-1206. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

R.J.

/Angela Ortiz/

Supervisory Patent Examiner, Art Unit 4151